

WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device, comprising the steps of:

forming a first well region by performing an ion implantation process
5 for implanting first ions into a semiconductor substrate, and then forming a
second well region in the first well region by performing an ion implantation
process for implanting second ions having larger mass than the first ions; and
forming a well region by performing an annealing process on the result
structure.

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2. A method of claim 1, wherein the first well region is formed by
implanting phosphorus (P) ions at a tilt angle of 3° to 13° with a dose in the
range of $1\text{E}11$ ions/ cm^2 to $1\text{E}14$ ions/ cm^2 at an energy of about 500 KeV to
3000KeV, by using a high-energy ion implantation device.

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3. A method of claim 1, wherein the second well region is formed by
implanting arsenic (As) ions having larger mass than phosphorus ions, at a tilt
angle of 3° to 13° with a dose of $1\text{E}11$ ions/ cm^2 to $1\text{E}14$ ions/ cm^2 at an energy of
about 100 KeV to 300KeV, by using a middle-current ion implantation device.

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4. A method of claim 1, wherein the annealing process is performed
using one of an RTP process performed under N_2 or H_2 gas atmosphere at a
temperature of 900°C to 1000°C for 10seconds to 60 seconds, or a furnace

process performed under N₂ or H₂ gas atmosphere at a temperature of 900 °C to 1100 °C for 10minutes to 60 minutes.

5 5. A method of claim 1, further comprising the steps of forming a region into which ions for adjusting a threshold voltage are implanted on the semiconductor substrate on which well regions are formed, and then forming a tunnel oxide film, a floating gate electrode, a dielectric film and a control gate electrode on an upper part of the semiconductor substrate.

10 6. A method of claim 1, further comprising a step of forming a screen oxide film serving as a buffer layer for suppressing a damage generated by the ion implantation process for forming the first well region and the second well region before forming the well region.